

THE CALCULATION OF SAMPLE SIZE

To calculate the minimum sample size for a study on mosques in Turkey, we can use the Cochran's formula which is a common method for sample size calculation for surveys or studies of proportions in large populations.

Cochran's formula is given by:

$$n_0 = \frac{Z^2 \cdot p \cdot (1-p)}{e^2}$$

Where:

- n_0 is the sample size
- Z is the Z-score (the number of standard deviations from the mean in a standard normal distribution corresponding to the desired confidence level)
- p is the estimated proportion of the attribute present in the population
- e is the desired level of precision (margin of error)

For a confidence level of 95%, which is commonly used, the Z-score is 1.96 (from standard normal distribution tables).

Based on the information provided:

• The population size (N) is 85 million people in Turkey. (80% are Sunni: $p = 0.80$)

• Potential mosque users are 75% of those 14 years and older. Since we don't have the exact age distribution, we'll assume that the proportion of the population that is 14 years and older is about 70% based on general demographic structures.

Therefore, the proportion of the population that are potential mosque users is $0.80 \times 0.75 \times 0.70$.

If we want a margin of error of 5% (which is a common choice), then $e = 0.05$. First, let's calculate the adjusted proportion p :

$$p = 0.80 \times 0.75 \times 0.70 = 0.42$$

Now we can use the Cochran formula to calculate n_0 :

$$\begin{aligned} n_0 &= \frac{1.96^2 \cdot 0.42 \cdot (1-0.42)}{0.05^2} \\ &= \frac{3.8416 \cdot 0.42 \cdot (0.58)}{0.0025} \end{aligned}$$

$$n_0 \approx 374.3$$

Since we cannot survey a fraction of a person, we round up to the nearest whole number. Thus, the minimum sample size n_0 is approximately 375.